

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:-  
/WHAT I CLAIM AS MY INVENTION:-**

1. A method of displaying three-dimensional vector orientations on a two-  
5 dimensional surface comprising:
- i. the steps of:
    - a. Collecting said three-dimensional information,
    - b. Transforming said three-dimensional Cartesian  
information to spherical co-ordinates,
    - 10 c. Assigning a predetermined display pattern to said  
spherical co-ordinates, and
    - d. Plotting said predetermined display pattern on said  
two-dimensional display,
  - ii. a step of calibrating said three-dimensional information,
  - 15 iii. a method for rapidly and visually determining the orientation  
of 3D vectors within a vector field,
  - iv. a method of rapidly visually correlating 3D vectors of a  
common orientation,
  - v. a method for rapidly isolating specific vector orientations and  
20 determining their exact co-ordinate location,
  - vi. a method for quickly displaying a scattergram of orientations  
within a specified study area or volume,

- vii. a method of enhancing the visual discrimination of subtle variation in vector orientation,
- viii. a methodology of presenting data that allows for the ability to incorporate rapid color change to the pixelated or voxelated image, allowing for a time varying display hence providing the user the ability to visualize slow time, real time or fast time visualization of the individual vector orientations within a dynamically changing vector field,

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2. The method of Claim 1 wherein said step of plotting comprises the steps of:

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- i. transmitting said predetermined display pattern to a plotter,
- ii. displaying said spherical co-ordinates corresponding to said display pattern on said two-dimensional display,

3. The method of Claim 1 wherein the tri-axial data measurement or its gradient is selected from the group consisting of:

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- i. geomagnetic,
- ii. fluid flow,
- iii. gravitational,
- iv. surface, and
- v. electro-magnetic field,

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4. The tri-axial data measurement of Claim 3 wherein said data measurement is collected by means selected from the group consisting of:

- i. airborne,

- ii. ground,
- iii. borehole, and
- iv. submarine,

5           5.       The method of Claims 1, 2 and 3 wherein the potential use exists for visualization of the orientation of the remnant vector for events occurring within the study area over geologic times of differing orientations of the earth's magnetic field, allowing for the ability to:

10                   i)       discriminate different ages of intrusive rock, even if the rock types are identical in composition and magnetic susceptibility,

                  ii)       determine the extent of later thermal aureoles above the Currie or Ne'el temperature of the constituent ferromagnetic minerals of the rock being measured,

                  iii)       discriminate some areas of folding and faulting,

15                   iv)       determine the extent of high-pressure alteration involving recrystallization of constituent ferromagnetic minerals,

                  v)       determine chemical alteration that may have changed the mineralization of the pre-existing rock,

20                   vi)       discern the relative attitude of areas of quiescently laid sedimentary rock and sediments based on the orientation of their fine ferromagnetic minerals orientating themselves to the existing earths magnetic field at the time of sedimentation,

                  vii)       extrapolate paleo-magnetic measurements as an aid to stratigraphic correlation and tectonic studies.